

Milestone Review Flysheet 2017-2018

Institution	St. Monica's Homeschool
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Milestone	FRR
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Vehicle Properties	
Total Length (in)	97.8
Diameter (in)	4.04
Gross Lift Off Weigh (lb.)	23.17
Airframe Material(s)	BlueTube
Fin Material and Thickness (in)	Aircraft plywood vacuum sealed with carbon fiber, 0.25"
Coupler Length/Shoulder Length(s) (in)	8

Motor Properties	
Motor Brand/Designation	Aerotech K1275R
Max/Average Thrust (lb.)	353/289
Total Impulse (lbf-s)	505.4
Mass Before/After Burn (lb.)	8.19/6
Liftoff Thrust (lb.)	353
Motor Retention Method	Aero Pack Tailcone retainer

Stability Analysis	
Center of Pressure (in from nose)	71.78
Center of Gravity (in from nose)	60.96
Static Stability Margin (on pad)	2.7
Static Stability Margin (at rail exit)	2.96
Thrust-to-Weight Ratio	13.4:1
Rail Size/Type and Length (in)	1515
Rail Exit Velocity (ft/s)	105

Ascent Analysis	
Maximum Velocity (ft/s)	674.8
Maximum Mach Number	0.6
Maximum Acceleration (ft/s^2)	493.43
Predicted Apogee (From Sim.) (ft)	5183

Recovery System Properties				
Drogue Parachute				
Manufacturer/Model		RocketMan Ballistic Drogue Mach II		
Size/Diameter (in or ft)		3 ft		
Altitude at Deployment (ft)		5280*/1000		
Velocity at Deployment (ft/s)		0*/115		
Terminal Velocity (ft/s)		115*/40		
Recovery Harness Material		Kevlar		
Recovery Harness Size/Thickness (in)		11/32"		
Recovery Harness Length (ft)		35		
Harness/Airframe Interfaces		3/16 "stainless steel quicklinks connected to 1/4" eyenuts		
Kinetic Energy of Each Section (Ft-lbs)	Booster Assembly	Payload assembly	Section 3	Section 4
	2,477*	2,603*	N/A	N/A
	233	266		

Recovery System Properties				
Main Parachute				
Manufacturer/Model		FruityChutes Iris Ultra Compact		
Size/Diameter (in or ft)		7 ft		
Altitude at Deployment (ft)		600 ft		
Velocity at Deployment (ft/s)		40		
Terminal Velocity (ft/s)		16 ft/s		
Recovery Harness Material		kevlar		
Recovery Harness Size/Thickness (in)		11/32"		
Recovery Harness Length (ft)		35		
Harness/Airframe Interfaces		3/16 "stainless steel quicklinks connected to 1/4" eyenuts		
Kinetic Energy of Each Section (Ft-lbs)	Section 1	Section 2	Section 3	Section 4
	31	30	N/A	N/A

Recovery Electronics	
Altimeter(s)/Timer(s) (Make/Model)	Featherweight Raven/Missile Works RRC3 Sport
Redundancy Plan and Backup Deployment Settings	The primary drogue bundle charge at apogee, back-up at apogee +1 sec. Primary drogue at 1,000 ft. back-up at 900 ft. Primary main at 600 ft. back-up at 500 ft.
Pad Stay Time (Launch Configuration)	4 hr.

Recovery Electronics		
Rocket Locators (Make/Model)	MissileWorks T3	
Transmitting Frequencies (all - vehicle and payload)	902-928 MHz	
Ejection System Energetics (ex. Black Powder)	Black Powder	
Energetics Mass - Drogue Chute (grams)	Primary	1.5
	Backup	1.8
Energetics Mass - Main Chute (grams)	Primary	3
	Backup	3.3
Energetics Masses - Other (grams) - If Applicable	Primary	0.1
	Backup	0.1

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Payload	
	Overview
Payload 1 We are sending brine shrimp to test the impact of G-Forces upon the shrimp. We are doing this to determine the likelihood that the shrimp could survive the forces.	

(official payload)	
Payload 2 (non-scored payload)	Overview
	N/A

Test Plans, Status, and Results

Ejection Charge Tests	Completed 2/16/18
Sub-scale Flight Tests	Flight #1 12/19/17 Cd=.55 First ejection charge did not fire, main tangled with nomax. Semi-ballistic flight. Flight #2 12/30/17 Cd=.55 Perfect flight.
Full-scale Test Flights	Flight#1 2/17/18 Cd=.55 Ignitor was placed outside of charge well, caused black powder to not fire. Ignitor for one cable cutter got pulled out, caused black powder not to fire. Drogue bundle did not have enough descent time to determine terminal velocity. Main parachute became twisted while in flight, still deployed safely. Launch vehicle fell in puddle, caused the forward recovery and electronics bay to become stuck. Both tubes had to be replaced because of warping frm water. a small amount of zippering occurred in forward recovery. All event occured, launch vehicle landed sfaely.

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Additional Comments

As our first deployment stage, a parachute will be bundled up by tying the drogue with a ziptie connected to a cable cutter. The cable cutter will then go off at 1000 ft and release the drogue. *Drogue Bundle

